Title: Skate Party

Brief Overview:

The following activities are designed to reinforce the solving of single variable open sentences using real–world problems. Students will solve problems that may be encountered during a fictional trip to a local skating rink. Students will determine the cost for renting and/or buying skates and various materials while on the trip. Vocabulary and graphing techniques will be used during the activities.

Links to NCTM 2000 Standards

Number and Operations

Students will work with numbers, operations, inverse operations, and the properties to solve equations.

Algebra

Students will work with patterns in table, graph, and equation form. They will use equations to represent and solve quantitative relationships. They will also analyze change using graphs.

Data Analysis and Probability

Students will use a graphical representation to represent and analyze data, and make predictions based on that data.

Problem Solving

Students will solve problems that arise in other contexts.

Communication

Students will use the language of mathematics through vocabulary exercises.

Connections

Students will recognize mathematics in other contexts.

Grade/Level:

Grades 6 – 8; Pre–Algebra.

Duration/Length:

Five 50–minute class periods.

Student Outcomes:

Students will be able to:

- Communicate in mathematical language the problems that they encounter on the skating trip.
- Translate verbal problems into algebraic equations.
- Solve equations to find answers to real–life problems.
- Use classroom materials and various types of technology to solve and graph real–life problems.
- Graph and analyze data, and make predictions based on that data

Materials and Resources:

- TI–83/TI–84TM Plus Calculators
- Graph paper
- Pencil/Pen
- Colored Pencils
- Transparencies
- Transparency Pens
- Sentence strips
- Blank paper
- Copies of worksheets/answer keys/assessment
    - Picture Perfect
    - Frayer Model Transparency
    - Frayer Model Teacher Notes
    - Skate Party Vocabulary Development
    - Vocabulary Exercise
    - Skate–A–While Rental Problem
    - Skate Party Word Problems
    - Skates: Rent or Buy?
    - Graphing/Predicting Skating Data
    - Skate Party Assessment

Development/Procedures:

Lesson 1:   Preassessment – This lesson will develop the vocabulary necessary for students to be successful in this unit. Begin the unit by listing the five new vocabulary terms (equation, inequality, open sentence, solve, variable) on the blackboard for an opening warm–up. Also, write these words on sentence strips that can be posted on a Word Wall in the room. Ask

students to copy these terms into their notebook and identify one description or symbol that they know for each term.

Launch – Handout worksheet "Picture Perfect" to students. Allow students to work quietly with a partner to answer the questions. Review student work.

Teacher Facilitation – Explain to students how to use the Frayer Model to outline vocabulary words. Refer to "Skate Party Vocabulary Development: Teacher Notes" for a description and example of the Frayer Model. Review the example for the vocabulary term "circle" or other word that students already know. Each student will need at least one blank sheet of paper and pencil for this activity.

Handout the student copy of "Skate Party Vocabulary Development". Review the procedure for the activity and have students work in pairs with one new vocabulary term from the warm–up activity. Monitor and assist students with any difficulties they may have with this activity.

Student Application – Allow students to complete their Frayer Model and then share their ideas on a transparency with the rest of the class.

Embedded Assessment – Have students brainstorm the vocabulary information shared on the transparency. Students should assess all information given and decide, by class discussion, if the definition and examples listed for each term are accurate. Students should review all answers and write the correct information in their notebooks.

- Reteaching/Extension – Review areas of concern for students who may have questions.
- Assign "Vocabulary Exercise" for review.

Lesson 2:   Preassessment – Have students use the new vocabulary terms from Lesson 1 in a sentence. Students should give an example for each, which has not been previously used.

Launch – Have students think of a time when they have been skating. Have students list all of the variables that are involved with skating (examples of this could be the type of skating involved; skating outside versus in a skating rink;

3

experiences with skating). Allow students to share this information through a class discussion.

Teacher Facilitation– Using the Frayer Model, review vocabulary terms used in graphing (axes, scale, title, key) to prepare for the upcoming lesson. Present the "Skate–A–While" Activity Problem by reading the prompt on the worksheet. Identify the types of variables that the 7th grade class will need to brainstorm in order to take the class trip.

Student Application–After reviewing the problem, allow students to complete the procedure for the activity. Students will need calculators to determine the cost for the activity, rulers for graphing the data, and colored pencils for identifying the answers for the two cost plans. Facilitate students as they work through the data analysis, graphing, and evaluation questions.

Embedded Assessment–Monitor student progress for the activity. Ask the class which plan seems to be the best for the class trip using a class discussion. Students should defend their choice.

Reteaching/Extension
- For those who have not completely understood the lesson, review what is needed.
- Students should complete "Skate Party Word Problems."

Lesson 3   Preassessment – Review "Skate Party Word Problems" from the previous day's Extension Activity. Review answers with students for questions.

Have a short discussion on the use of data to make predictions, and the power of the graphing calculator for such a task.

Launch – Distribute "Graphing/Predicting Skating Data." Read the Introduction together. Preview the pages of the handout together to observe that there are three parts to this activity: Enter the data, Graph the data, and Make predictions.

Teacher Facilitation – Distribute the calculators. Lead the students through the steps of the handout, stopping after each part to

ensure that all students are on task. Remind students periodically to signal for help as soon as possible in order to stay with the class.

Student Application – While the teacher leads the students through the steps, the students can follow along in the handout and compare the screen shots on the handout to their own calculator displays. Again, students need to signal the teacher for help as soon as possible.

Embedded Assessment – Observe the students and their calculators throughout the activity. At the end of the last section, observe that all students have made their predictions.

Reteaching/Extension –
- Students must ask for help as soon as possible, rather than wait until the end.
- Discuss the results, including the Discussion questions at the end of the handout. An optional Scoring Rubric may be used for assessment.
- Assign worksheet "Skates, Rent or Buy" activity

Summative Assessment:

Students will be assessed daily based on performance. Both computational ability and completed tasks will be used to evaluate each student's progress. Scoring rubrics will be used to assess student progress.

Use "Skate Party Assessment" to determine student progress for this unit.

Authors:
Maureen Hahn   Ed Hopkins
St. Ursula School   St. Pius X Regional School
Baltimore Archdiocese, MD   Prince George's County, MD

Kathleen Swingle
Beacon Middle School
Sussex County, DE

Picture Perfect

Shawn wants to take a picture of Matt and Allie skating together in front of the disco ball. Unfortunately Matt and Allie aren't skating together. Allie can skate around the rink every 45 seconds, while Matt takes two minutes to get all the way around.
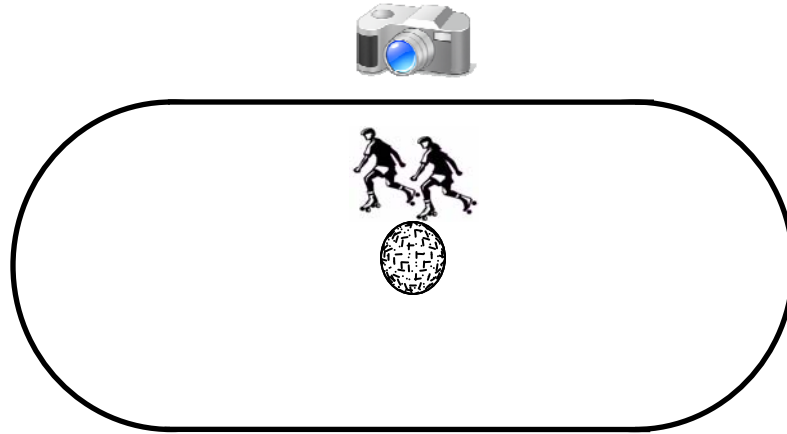
Shawn sees Allie pass Matt in front of the disco ball, and notices that if he had taken the picture at that moment it would look like they were skating together. He turns on his camera and waits for Allie to pass Matt again.
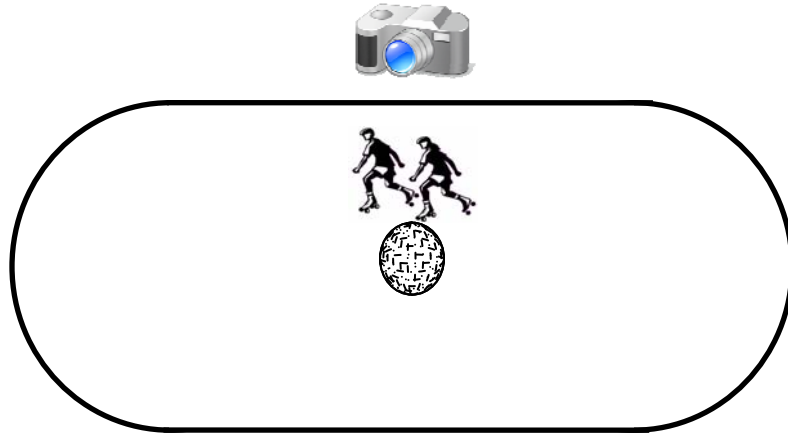
1. How long will it take for Allie to pass Matt again? _____
   Show your work.

2. Will Allie pass Matt in front of the disco ball? _____
   Explain your answer.

3. How long will it take for Shawn's next chance to get the picture he wants? _____
   Show your work.

4. What techniques did you use to solve problems 1-3?

5. What factors or variables would allow Allie to travel faster than Matt?

Picture Perfect   Name: __**ANSWER KEY**____

   Shawn wants to take a picture of Matt and Allie skating together in front of the disco ball. Unfortunately Matt and Allie aren't skating together. Allie can skate around the rink every 45 seconds, while Matt takes two minutes to get all the way around.

   Shawn sees Allie pass Matt in front of the disco ball, and notices that if he had taken the picture at that moment it would look like they were skating together. He turns on his camera and waits for Allie to pass Matt again.

1. How long will it take for Allie to pass Matt again?   72 sec

2. Will Allie pass Matt in front of the disco ball?   No, 3/5 of the way around

3. How long will it take for Shawn's next chance to get the picture he wants?   6 min

4. What techniques did you use to solve problems 1-3? Students may say that they used mathematical calculations to solve the problems or that they drew pictures of the skaters around the track to determine the time and distance traveled.

5. What factors or variables would allow Allie to travel faster than Matt? Students may answer skill or training, better skates, or that injury may influence travel times.

Students should work in small groups. They should not be expected to use equations to solve this problem. They should draw diagrams and use guess and check.

They may discover that 360 seconds is the LCM of 45 and 120.

Skate Party: Vocabulary Development   Name: _____
(Student Copy)

Directions: During this activity you will define vocabulary terminology, both past and new terms. These terms will help you with this upcoming activity. Work with a partner or group to identify characteristics for these words.

Materials: Pencil, Frayer Model chart format, vocabulary terms, blank sheet of paper.

Procedure
1) Copy the vocabulary terms into your math notebook.
   - Equation
   - Inequality
   - Open Sentence
   - Solve
   - Variable
2) Fold a blank paper into four sections.
3) Label each section following the format outlined in the diagram.
4) Write the vocabulary term in the center oval section.
5) With you partner, identify your definition and facts for the term and list both essential (important) and non–essential examples for each term. Pictures may be used for some answers.
6) Share your ideas for the definition and factual area with your class by writing these on a class chart. List new class ideas on your model or in your notebook.
7) As a class, discuss the results and identify the information that is true about the vocabulary term.

Definition	Fact/ Characteristics
Examples	Non-examples
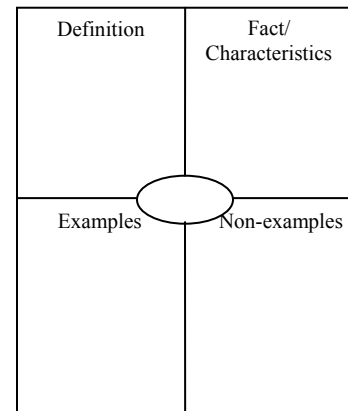
Conclusion
 Explain how this activity helped you organize your ideas for the new vocabulary terms.

Frayer Model Transparency
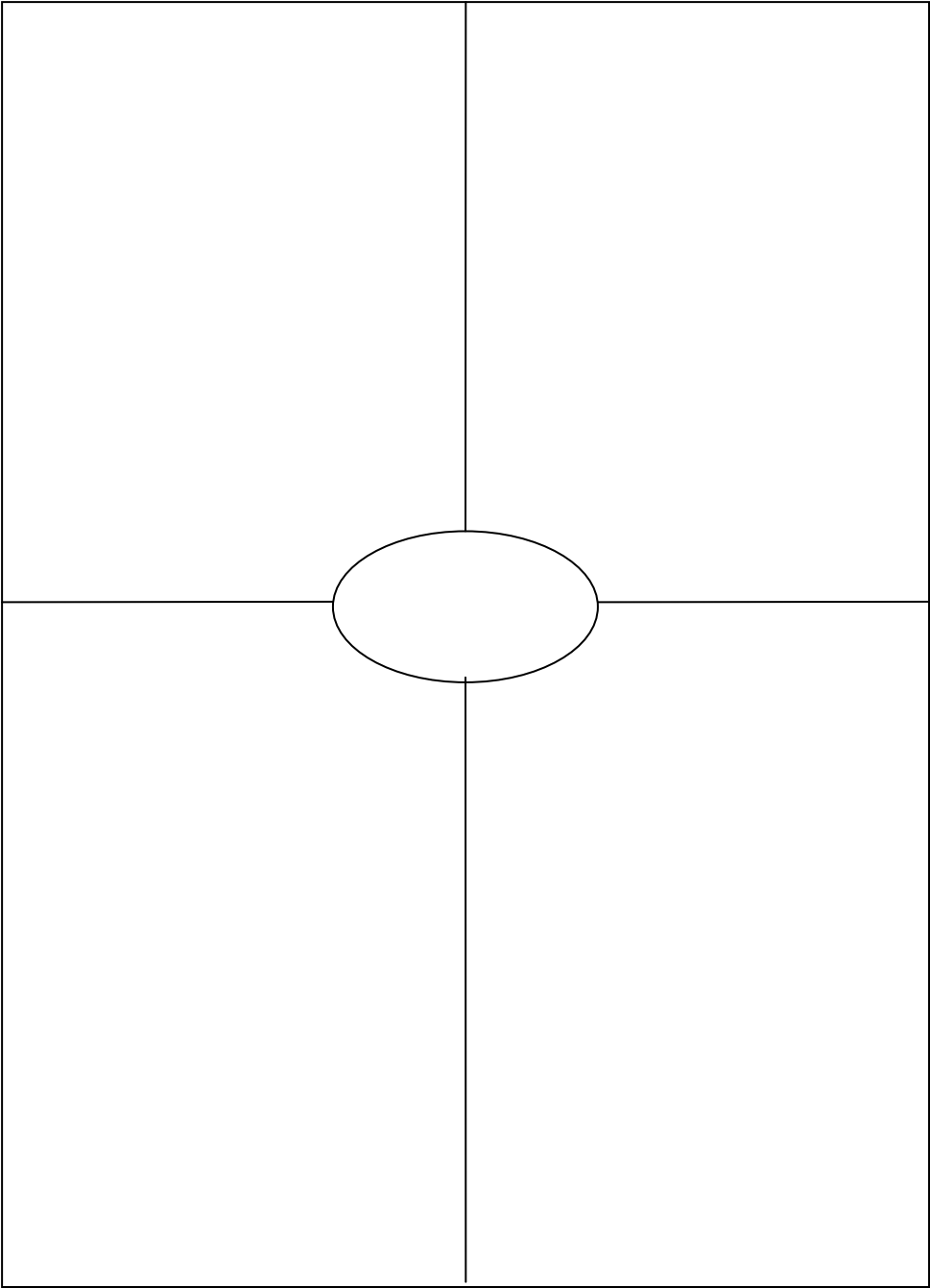
Skate Party: Vocabulary Development
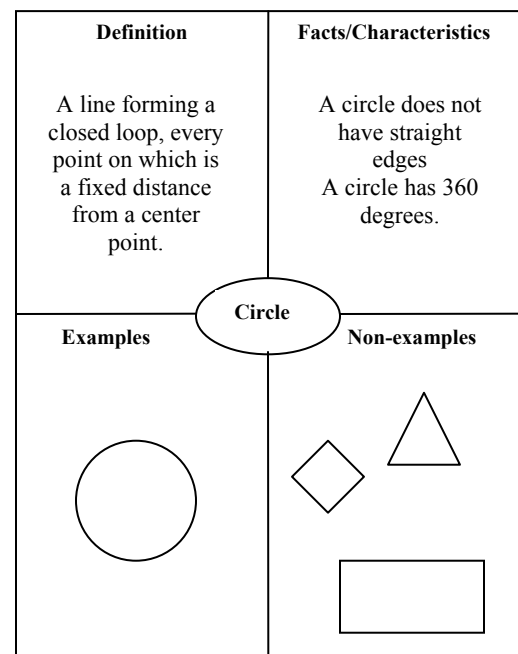Teacher Notes:

        The Frayer Model is one method to use when reviewing or introducing new vocabulary terms and concepts. The model uses a graphic organizer as outlined on this page that will assist students in generating definitions for vocabulary terms or concepts. Students will define the term, list important facts or characteristics for the terms, and provide examples and non–examples for each term. This activity will assist students by having them build on prior knowledge they may already know to make connections to new vocabulary terms or concepts. This activity will also allow students to analyze this knowledge and use it to think critically to find and build relationships between these concepts.

Materials: Vocabulary terms (equation, inequality, open sentence, solve, variable); transparency for Frayer Model chart format; transparency pens; references from the Internet.

- **Frayer, D.A., Frederick, W.C. & Klausmeier, H.J.**
  A schema for testing the level of concept mastery (Technical Report #16).
  University of Wisconsin Research and Development Center for Cognitive Learning, 1969
- http://oame.on.ca/main/files/thinklit/FrayerModel.pdf
- http://www.edu.gov.on.ca/eng/studentsuccess/lms/index.html Ontario Ministry of Education

Teacher Procedure:

1) Review the Frayer model with your students. Make a copy of the model to use on a transparency or write the model on the blackboard.

2) Place a term in the center circle that students can identify from past experiences, such as the word "circle."

3) Lead a class discussion on the definitions, facts and essential/non–essential characteristics for the term. Possible answers are shown in the model below.

4) Have students work in pairs and assign one new vocabulary term to each group. You may wish to have your students read a section in their textbook to help them to complete the model.

5) Ask students to share their ideas with the class and record these ideas for the new vocabulary introduced.

Definition	Facts/Characteristics
A line forming a closed loop, every point on which is a fixed distance from a center point.	A circle does not have straight edges A circle has 360 degrees.
Examples	**Non-examples**

Circle

Vocabulary Exercise   Name: _____

1.   Vocabulary Term: *Variable*

- In the formula $A = \pi r^2$, which symbols are **variables**?

A □ yes □ no   why?   _____

$=$ □ yes □ no   why?   _____

π □ yes □ no   why?   _____

r □ yes □ no   why?   _____

^{2} □ yes □ no   why?   _____

2.   Vocabulary Term: *Open Sentence*

- Which of the following are **open sentences**?

$2x + 5 = 11$ □ yes □ no   why?   _____

$\dfrac{x+3}{5}$ □ yes □ no   why?   _____

$7x \leq 14$ □ yes □ no   why?   _____

$2 \cdot 3 + 5 = 11$ □ yes □ no   why?   _____

$a^2 + b^2 = c^2$ □ yes □ no   why?   _____

3.   Vocabulary Term: *Solve*

- Which of the following can be **solved**?

$2(x + 17)$ □ yes □ no   why?   _____

$x - 7 = 11$ □ yes □ no   why?   _____

$5x + 4 - 2x$ □ yes □ no   why?   _____

$5x > 30$ □ yes □ no   why?   _____

$\dfrac{1}{7} + \dfrac{3}{7} + \dfrac{10}{7}$ □ yes □ no   why?   _____

4. **Vocabulary Term:** *Equation*

- Which of the following are **equations**?

$x = 3$ □ yes   □ no   why? _____

$x + 3$ □ yes   □ no   why? _____

$x > 3$ □ yes   □ no   why? _____

$1 + 2 = 3$ □ yes   □ no   why? _____

$1 + 2 = 4$ □ yes   □ no   why? _____

5. **Vocabulary Term:** *Inequality*

- Which of the following are **inequalities**?

$1 + 2 > 4$ □ yes   □ no   why? _____

$1 + 2 < 4$ □ yes   □ no   why? _____

$1 + 2 = 4$ □ yes   □ no   why? _____

$x + 2 = 4$ □ yes   □ no   why? _____

$x + 2 < 4$ □ yes   □ no   why? _____

Vocabulary Exercise   Name: __**ANSWER KEY**____

1.   **Vocabulary Term:** *Variable*   Variables are unknown values

   • In the formula $A = \pi r^2$, which symbols are **variables**?

A   _√√_ yes __ no why? _____ Its value is unknown _____

=   __ yes _√√_ no why? _____ It is an equal sign _____

π   __ yes _√√_ no why? _____ Its value is always ≈ 3.14 _____

r   _√√_ yes __ no why? _____ Its value is unknown _____

²   __ yes _√√_ no why? _____ It is a number, its value is always 2 _____

2.   **Vocabulary Term:**   ***Open*** *Sentence* Open sentences have variables and equal
                                                                 or inequality signs

   • Which of the following are **open sentences**?

$2x + 5 = 11$ _√√_ yes __ no why? _____ It has a variable and an equal sign _____

$\dfrac{x+3}{5}$ __ yes _√√_ no why? _____ It has a variable but no equal sign _____

$7x \leq 14$ _√_ yes __ no why? _____ It has a variable and an inequality sign _____

$2 \cdot 3 + 5 = 11$ __ yes _√√_ no why? _____ It has an equal sign but no variables _____

$a^2 + b^2 = c^2$ _√√_ yes __ no why? _____ It has variables and an equal sign _____

3.   **Vocabulary Term:**   *Solve*   Only open sentences can be solved, (other
                                                          expressions are simplified or evaluated)

   • Which of the following can be **solved**?

$2(x + 17)$ __ yes _√_ no why? _____ *x* cannot be found; it can only be simplified __

$x - 7 = 11$ _√_ yes __ no why? _____ *x* can be found; it's an open sentence _____

$5x + 4 - 2x$ __ yes _√_ no why? _____ *x* cannot be found; it can only be simplified __

$5x > 30$ _√_ yes __ no why? _____ *X* can be found; it's an open sentence _____

$\dfrac{1}{7} + \dfrac{3}{7} + \dfrac{10}{7}$ __ yes _√_ no why? _____ There is no variable; it can be evaluated _____

13

_____**4.**   **Vocabulary Term:**   *Equation*   An equation is a math sentence with an equal sign.

- Which of the following are **equations**?

$x = 3$ _√_ yes __ no why? It is a math sentence with an equal sign. _____

$x + 3$ __ yes _√_ no why? There is no equal sign. _____

$x > 3$ __ yes _√_ no why? There is no equal sign. _____

$1 + 2 = 3$ _√_ yes __ no why? It is a math sentence with an equal sign. _____

$1 + 2 = 4$ _√_ yes __ no why? It is a math sentence with an equal sign. _____

5.   **Vocabulary Term:**   *Inequality*   An equation is a math sentence with an inequality sign.

- Which of the following are **inequalities**?

$1 + 2 > 4$ _√_ yes __ no why? It is a math sentence with an inequality sign. _____

$1 + 2 < 4$ _√_ yes __ no why? It is a math sentence with an inequality sign. _____

$1 + 2 = 4$ __ yes _√_ no why? There is no inequality sign. _____

$x + 2 = 4$ __ yes _√_ no why? There is no inequality sign. _____

$x + 2 < 4$ _√_ yes __ no why? It is a math sentence with an inequality sign. _____

Skate–A–While Rental Problem   Name: _____

The seventh grade class is planning a skating trip to the "Skate–A–While" recreation center as the end of the year trip.   The cost of the trip can vary depending on the number of rentals and the number of hours spent skating. The student council must decide which cost plan is the most economical for students who plan to attend the trip.

Materials
Cost information from the recreation center
Calculator
Pencil
Colored Pencils
Ruler

Skate-A-While Recreation Center

Procedure
1) Study the cost information provided in the "Skate–A–While" flyer.
2) Calculate the admission cost for each plan using the following numbers of skaters attending the trip: 0, 25, 50, 75, 100, 125, and 150.
3) Write the cost for each admission in the data chart.
4) Graph each set of data to determine when each plan will be most cost effective.
5) Answer all evaluation questions for the activity.

Cost for 3-Hours of Skating Fun!
Admission A: $3.00/person

Admission B: $100.00 for large groups + $2.00/ person

Data Chart

Number of Skaters	Admission A Cost	Admission B Cost
0		
25		
50		
75		
100		
125		
150		

Graph

Graph data for Admission Cost A and B on the graph below. Include a title, labels for each axis, and a key to identify the cost for each admission.
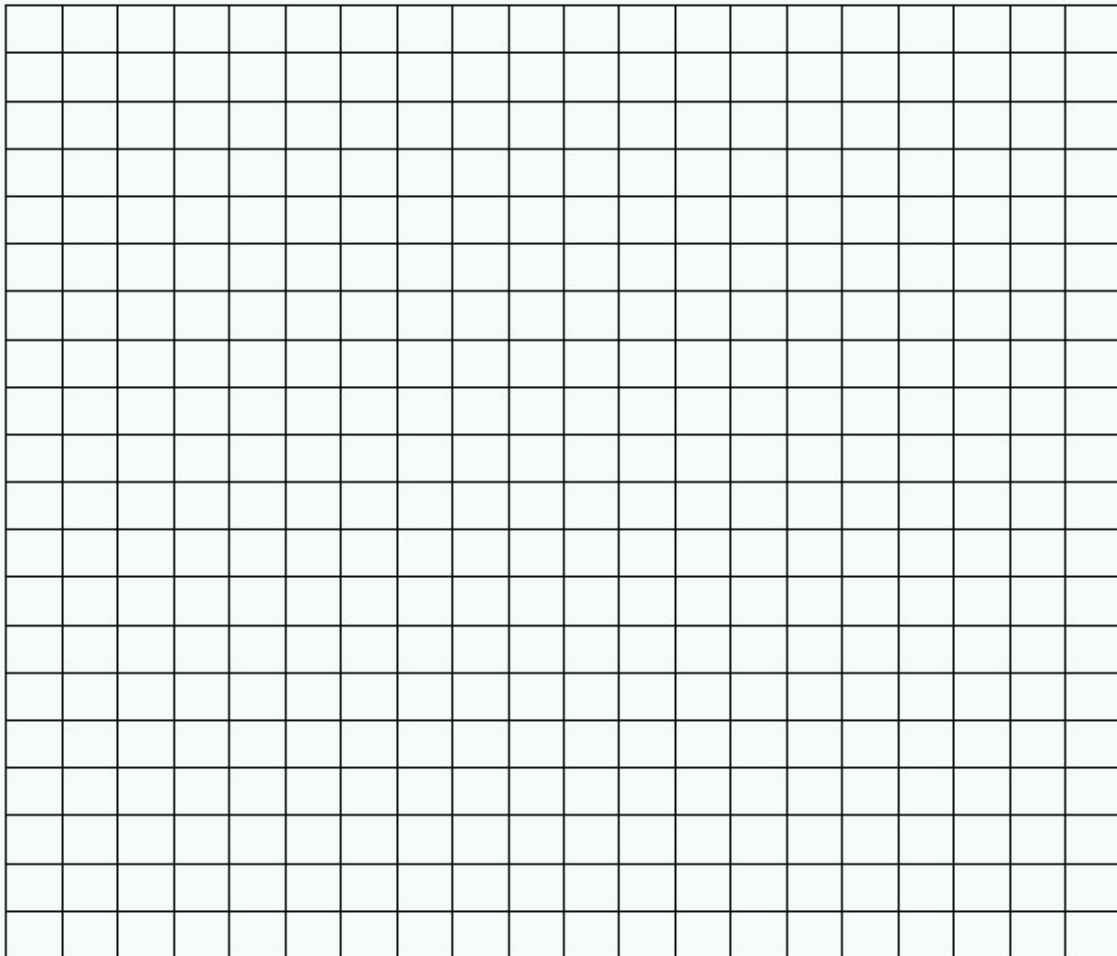
Evaluation Questions: Use complete sentences for your explanations.

1) Using your graph and data, locate the admission cost for both plans when the cost will be equal. How many skaters does this represent? _____
Explain how you located this point using your graph and data chart.

2) The seventh grade class does not know how many students will definitely attend the class trip. Which plan would you select for the class trip? Explain your choice using supporting data. Choice: _____
Explanation:

3) Write an equation for Admission A and B using variable C for the cost and variable S for the number of skaters.

Admission A equation: _____ = $3.00 _____

Admission B equation: _____ = _____ + $2.00 _____

4) Calculate the cost for 300 skaters using both Admissions A and B. List each equation and all show all work neatly.

5) The skating center also has an Admission C cost which charges $1.50 for entry and $.50 per hour. (Review #3 and 4 above for help)
a) Write an equation for this admission.

b) Calculate the cost for Admission C based on 100 skaters for 3 hours.

c) Explain how this admission compares with Admissions A and B.

Skate–A–While Rental Problem   Name: _**ANSWER KEY**___

The seventh grade class is planning a skating trip to the "Skate–A–While" recreation center as the end of the year trip.   The cost of the trip can vary depending on the number of rentals and the number of hours spent skating. The student council must decide which cost plan is the most economical for students who plan to attend the trip.

Materials
Cost information from the recreation center
Calculator
Pencil
Colored Pencils
Ruler

Skate-A-While Recreation Center

Procedure
1) Study the cost information provided in the "Skate–A–While" flyer.
2) Calculate the admission cost for each plan using the following numbers of skaters attending the trip: 0, 25, 50, 75, 100, 125, and 150.
3) Write the cost for each admission in the data chart.
4) Graph each set of data to determine when each plan will be most cost effective.
5) Answer all evaluation questions for the activity.

Cost for 3-Hours of Skating Fun!
Admission A: $3.00/person

Admission B: $100.00 for large groups + $2.00/ person

Data Chart

Number of Skaters	Admission A Cost	Admission B Cost
0	**0**	
25	**75**	**150**
50	**750**	**200**
75	**225**	**250**
100	**300**	**300**
125	**375**	**350**
150	**450**	**400**

Graph

Graph data for Admission Cost A and B on the graph below. Include a title, labels for each axis, and a key to identify the cost for each admission.
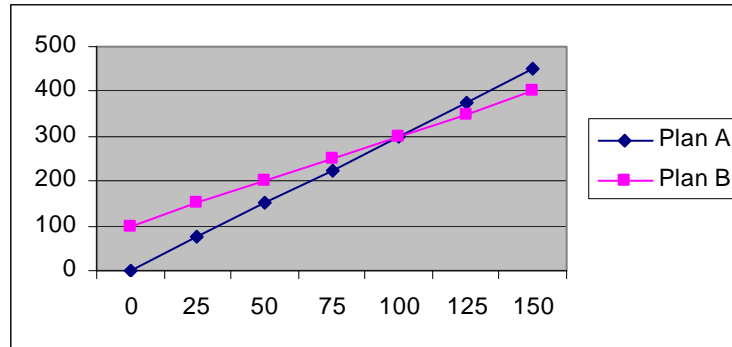
Evaluation Questions: Use complete sentences for your explanations.

1) Using your graph and data, locate the admission cost for both plans when the cost will be equal. How many skaters does this represent?   **100**
Explain how you located this point using your graph and data chart.

> **In the data chart, find the line where Admission A Cost equals Admission B Cost.**
> **In the graph, find the point where the two lines intersect.**

2) The seventh grade class does not know how many students will definitely attend the class trip. Which plan would you select for the class trip? Explain your choice using supporting data. Choice: _____
Explanation:

> **Students should support their answers with data from the activity. This answer will vary on the number of students who plan to attend the trip.**

3) Write an equation for Admission A and B using variable C for the cost and variable S for the number of skaters.

Admission A equation: $C = \$3.00 \times S$

Admission B equation: $C = \$100 + \$2.00 \times S$

4) Calculate the cost for 300 skaters using both Admissions A and B. List each equation and all show all work neatly.

> i. $C = \$3.00 \times 300$ $C = \$900$
> ii. $C = \$100 + (\$2.00 \times 300)$ $C = \$700$

5) The skating center also has an Admission C cost which charges $1.50 for entry and $.50 per hour. (Review #3 and 4 above for help)
a) Write an equation for this admission.

> $C = S \times (1.50 + .50h)$ **(h represents the number of hours)**

b) Calculate the cost for Admission C based on 100 skaters for 3 hours.

> $C = 100 \times (1.50 + .50 \times 3)$ $C = \$300$

c) Explain how this admission compares with Admissions A and B.
> **Answer may vary**

Skate Party Word Problems   Name: _____

For each problem, write an open sentence and solve.

1. Jenna's new skates cost $5.50 more than her old skates. If her new skates cost $30.00, what was the cost of her old skates? (Let c = cost of old skates.)

2. Matt bought sodas for himself and his two friends. The cost was $9.75. What was the cost of each soda? (Let p = cost of one soda.)

3. Julie has saved $16.25. How much more money does she need to buy a $25.00 pair of skates? (Let m = the amount of money Julie still needs.)

4. Greg brought $15 spending money with him to the party. If he still had $6.50 at the end of the night, how much did he spend?? (Let s = the amount Greg spent.)

5. There were approximately 75 minutes of playing time for music during the party. If the average time of each song was 4 minutes, about how many songs were played? (Let s = the amount Greg spent.)

For each problem, write an open sentence and solve.

1. Jenna's new skates cost $5.50 more than her old skates. If her new skates cost $30.00, what was the cost of her old skates?

   $c + 5.50 = 30.00$

   $c = 24.50$

2. Matt bought sodas for himself and his two friends. The cost was $9.75. What was the cost of each soda?

   $3p = 9.75$

   $p = 3.25$

3. Julie has saved $16.25. How much more money does she need to buy a $25.00 pair of skates?

   $16.25 + m = 20.00$

   $m = 3.75$

4. Greg brought $15 spending money with him to the party. If he still had $6.50 at the end of the night, how much did he spend?

   $15.00 - s = 6.50$

   $s = 8.50$

5. There were approximately 75 minutes of playing time for music during the party. If the average time of each song was 4 minutes, about how many songs were played?

   $4n = 75$

   $n = 18.75$ **(or about 18 songs)**

Skates: Rent or Buy?   Name: _____

Emily and Megan are looking at skates to buy. They find some for
$34.95 a pair. Megan points out that skate rental is only $2.50, but
Emily reminds her that they plan to go skating a lot – once a week for
the whole summer. How can they choose the best deal?

1. How many weeks are in summer vacation? _____

2. How much would it cost one person to rent skates that many times? _____

3. Could buying ever be cheaper than renting skates? _____
    Explain:

4. Identify a variable and write an equation or inequality to find the number of skate
    rentals that would be more expensive than the cost of buying the skates.

5. Solve the inequality.

6. Megan decides to rent her skates. What reasons do you think she gives? (Identify
    at least 2 reasons.)

7. Emily decides to buy her skates. What reasons do you think she gives? (Identify
    at least 2 reasons.)

Skates: Rent or Buy?   Name: __**ANSWER KEY**____

Emily and Megan are looking at skates to buy. They find some for
$34.95 a pair. Megan points out that skate rental is only $2.50, but
Emily reminds her that they plan to go skating a lot – once a week for
the whole summer. How can they choose the best deal?

1. How many weeks are in summer vacation? __10 / 11 / 12_

2. How much would it cost one person to rent skates that many times? _$25 / $27.50
   / $30_

3. Could buying ever be cheaper than renting skates? __yes__
   Explain: If you go skating 14 times it would cost $35 to rent skates.

4. Identify a variable and write an equation or inequality to find the number of skate
   rentals that would be more expensive than the cost of buying the skates.

   $$x = \text{number of rentals} \qquad 2.5x > 34.95$$

5. Solve the inequality. $\dfrac{2.5x}{2.5} > \dfrac{34.95}{2.5}$

   $$x > 13.98$$

6. Megan decides to rent her skates. What reasons do you think she gives? (Identify
   at least 2 reasons.)

   She doesn't think she will go skating 14 times or more.
   Her feet might outgrow the skates if she buys them.
   She doesn't want to spend so much money at once.
   She doesn't have $34.95.

7. Emily decides to buy her skates. What reasons do you think she gives? (Identify
   at least 2 reasons.)

   She thinks she will skate 14 times or more before she outgrows the skates.
   She can use them at home, too.
   She thinks rentals are ugly, stinky, uncomfortable, etc.
   She can get some of her money back by selling the skates when she outgrows
   them.

Graphing / Predicting Skating Data   Name: _____

Using the TI–83/TI–84^{TM} Plus Calculator

Introduction

While helping to plan the 7th grade Skate Party, one of the students (Beth) discovered some statistics on the number of people in the U.S. who inline skated at least once during a given recent year. According to the article, the number of participating skaters in the U.S. during the years 1998–2004 is as follows:

1998 – 32 million skaters
1999 – 28 million skaters
2000 – 29 million skaters
2001 – 26 million skaters
2002 – 22 million skaters
2003 – 19 million skaters
2004 – 17 million skaters

(http://www.skatelog.com/skates/industry–statistics.htm)

Beth, an avid skater, was surprised to see that the numbers were decreasing, and decided to make some predictions using her calculator. Follow the steps in the Procedure section below to do the same.

Procedure

Part I: Enter the data

1. Turn the calculator on.
2. Press **STAT** –> **ENTER**
3. Enter the years in L1 and the numbers in L2

Part II: Graph the data.

1. Press 2nd –> **Y=** to go to the **STAT PLOT** screen
2. Choose **PLOT1** by pressing **ENTER**
3. Highlight **ON** and press **ENTER.** Move down to **Type**. Choose the line plot by highlighting the second of the pictured graphs and press **ENTER**.
4. Move down to **Xlist** and choose **L1** by pressing 2nd **1.** Move down to **YList** and choose **L2** by pressing 2nd **2.**
5. Move down to **Mark** and highlight one of the marks and press **Enter**.
6. Press **ZOOM**. Choose option **9: ZoomStat** and press **ENTER** to show the graph of the data.

Discussion: Predicting the data

1. Are the numbers of skaters increasing or decreasing?

2. What is the predicted number of skaters for 2005?

3. If the current trend continues, when will the number of skaters fall to zero? Is this realistic?

Using the TI–83/TI–84$^{\text{TM}}$ Plus Calculator

Answers to Discussion

1. Decreasing

2. About 14.714

3. 2011; This may or may not be realistic depending on other conditions or situations (for ex., skating may become more popular again in a certain community because a new and exciting rink opens up) (answers will vary).

Scoring Rubric
Graphing / Predicting Skating Data

Using the TI–83/TI–84[TM] **Plus Calculator**

Rubric

Process	Below Avg.	Satisfactory	Excellent
1. Has clear vision of final product	1, 2, 3	4, 5, 6	7, 8, 9
2. Properly organized to complete project	1, 2, 3	4, 5, 6	7, 8, 9
3. Managed time wisely	1, 2, 3	4, 5, 6	7, 8, 9
4. Acquired needed knowledge base	1, 2, 3	4, 5, 6	7, 8, 9
5. Communicated efforts with teacher	1, 2, 3	4, 5, 6	7, 8, 9
Product (Project)	**Below Avg.**	**Satisfactory**	**Excellent**
1. Format	1, 2, 3	4, 5, 6	7, 8, 9
2. Mechanics of speaking/writing	1, 2, 3	4, 5, 6	7, 8, 9
3. Organization and structure	1, 2, 3	4, 5, 6	7, 8, 9
4. Creativity	1, 2, 3	4, 5, 6	7, 8, 9
5. Demonstrates knowledge	1, 2, 3	4, 5, 6	7, 8, 9, 10
6. Other:	1, 2, 3	4, 5, 6	7, 8, 9

Total points: _____

Skate Party Assessment   **Name**_____

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ 1. Choose the symbol that makes this number statement true.

$$-\frac{3}{4} \; ? -0.34$$

    a.   >   b.   <

_____ 2. Given the expression $3 \times (12 - 7)$, find the expression that is equivalent.

    a. $(3 \times 12) - 7$ b. $(3 \times 12) - (3 \times 7)$

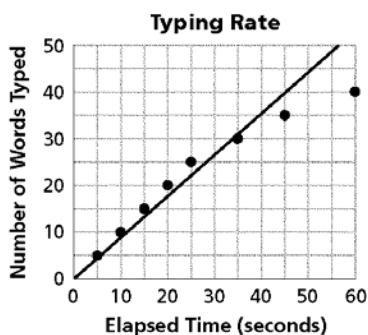_____ 3. Consider the equation $y = 3x - 6$. Find y if $x = 3$.

    a.   2   b.   3

4. What is the value of y when x is 68?

X	Y
92	23
96	24
100	25
104	26

    a.   16   b.   17

_____ 5. Approximately how many words had this student typed in 40 seconds?

    a.   30   b.   35

_____ 6. The equation $c = 0.75t$ represents the total cost of tickets for carnival games. Which table best represents this equation?

a.

Tickets	1	2	3	4
Cost	$0.75	$1.50	$2.25	$3.00

b.

Tickets	1	2	3	4
Cost	$0.75	$1.00	$1.25	$1.50

7. Which problem situation matches the equation $5x = 90$?

    a. Maureen charges $5 per hour to cut lawns. What is the number of hours, x, that Maureen worked if she charged $80 for her labor?

    b. Lizzie drove a total of 80 miles this week. She drove 5 miles more than last week. What in the number of miles, x, that Lizzie drove last week?

8. If $y = x - 17$, what is the value of x when $y = 34$?

    a. −51   b. 51

Short Answer
In the 2008 presidential election, Maryland had 10 electoral votes. That was 17 votes less than the number of electoral votes in Florida. Write and solve an equation to find the number of electoral votes in Florida (let F = number of votes in Florida).

Multiple Choice
Identify the choice that best completes the statement or answers the question.

B   1. Choose the symbol that makes this number statement true.

$$-\frac{3}{4} \; ? -0.34$$

     a.   >   b.   <

B   2. Given the expression $3 \times (12 - 7)$, find the expression that is equivalent.

     a. $(3 \times 12) - 7$ b. $(3 \times 12) - (3 \times 7)$

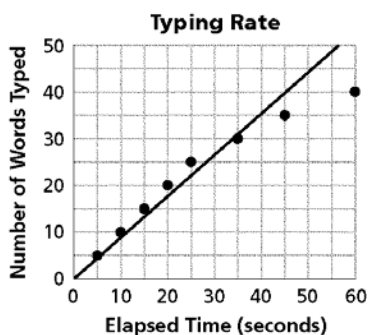B   3. Consider the equation $y = 3x - 6$. Find y if $x = 3$.

     a.   2   b.   3

B   4. What is the value of y when x is 68?

X	Y
92	23
96	24
100	25
104	26

     a.   16   b.   17

A   5. Approximately how many words had this student typed in 40 seconds?

Typing Rate

     a.   35   b.   45

A   6. The equation $c = 0.75t$ represents the total cost of tickets for carnival games. Which table best represents this equation?

a.

Tickets	1	2	3	4
Cost	$0.75	$1.50	$2.25	$3.00

b.

Tickets	1	2	3	4
Cost	$0.75	$1.00	$1.25	$1.50

31

A   7. Which problem situation matches the equation $5x = 90$?

    a. Maureen charges $5 per hour to cut lawns. What is the number of hours, x, that Maureen worked if she charged $80 for her labor?

    b. Lizzie drove a total of 80 miles this week. She drove 5 miles more than last week. What in the number of miles, x, that Lizzie drove last week?

B   8. If $y = x - 17$, what is the value of x when $y = 34$?

    a. -51 b. 51

Short Answer
In the 2008 presidential election, Maryland had 10 electoral votes. That was 17 votes less than the number of electoral votes in Florida. Write and solve an equation to find the number of electoral votes in Florida (let F = number of votes in Florida).

($F - 17 = 10$; $F = 27$)